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**DEVICES FOR PROTECTION AGAINST ADVERSE WEATHER**  
**CONDITIONS**

This invention relates to devices for protection against adverse weather conditions including foldable umbrellas and devices of similar configuration such as parasols or sun shades.

Umbrellas and parasols are well known and typically take the form of a foldable framework which, when erected, has stretched over it a sheet of material which provides a protective cover against rain, sun or other undesirable weather. In the case of umbrellas the material is normally water resistant. The frame of these known devices comprises a handle portion which, when the device is erect, extends from the centre of the stretched material, the stretched material forming a typically domed surface at the top of the handle portion when the device is in use. A number of support arms extend from the handle portion beneath the stretched material when the device is in use so as to support the domed surface.

For maximum protection from adverse weather conditions such as heavy rain, snow, or strong sunlight, a user would desirably position himself at the centre of the protective domed surface of these known devices, this however is difficult when the only means for holding the device extends from the centre of the domed surface.

FR-A-848421 discloses an umbrella with an off-set handle fixed to a point of the external periphery and also connected to a vertical axis around which the umbrella is arranged. FR-A-948421 discloses foldable stiffeners that are connected to each other and to a cover by a central rosette. The large number of moulded components required would complicate the manufacture of this arrangement.

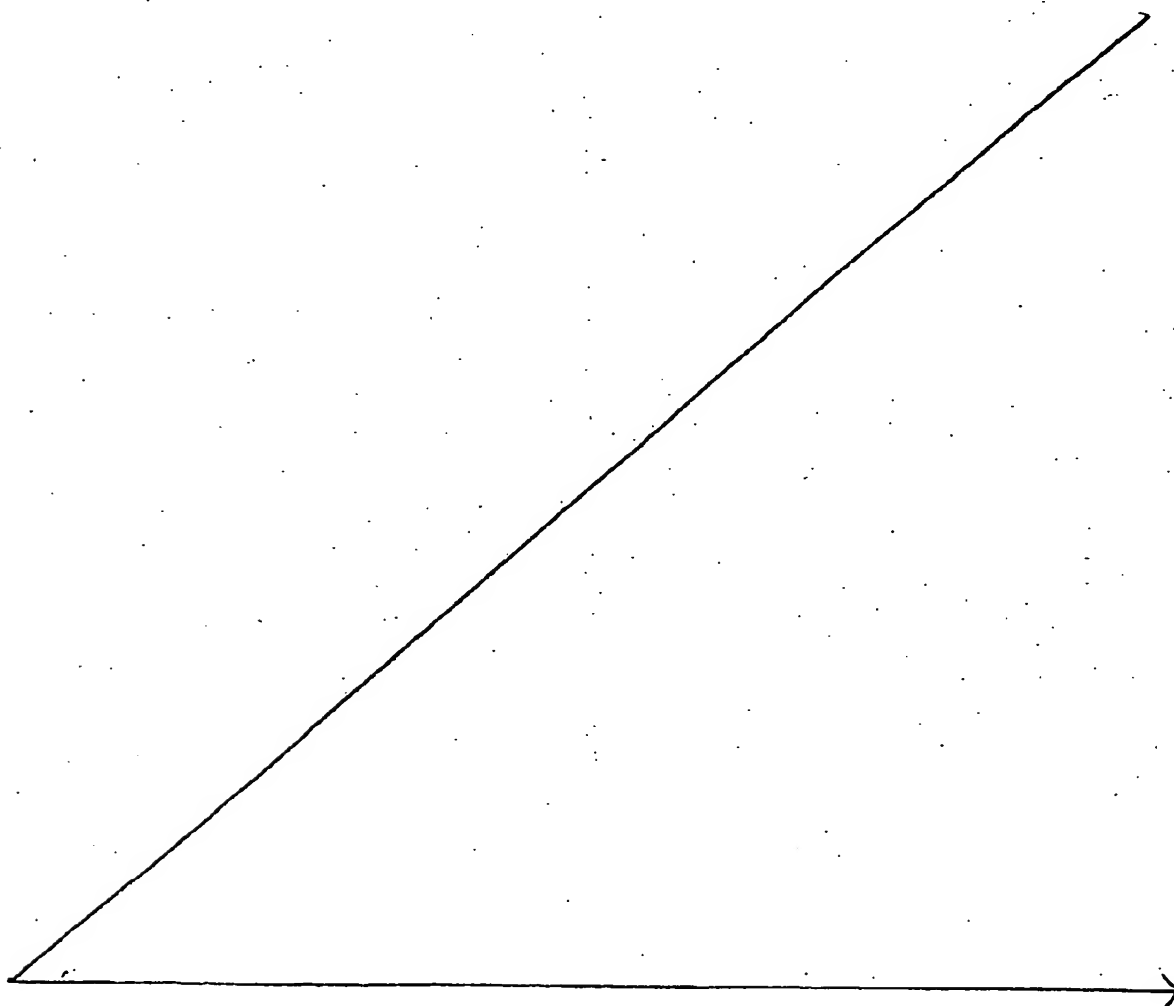
The present invention provides a device for protection against adverse weather conditions comprising; a framework foldable between a storable

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configuration and an erect configuration and a sheet of weather resistant material mounted on the frame, the sheet of weather resistant material forming, when the frame is in its erect configuration, a protective cover which can be positioned over a user to protect against adverse weather conditions, wherein, when erect, the frame is supported by a handle which extends from a position which is spaced apart from the centre of the erected frame.

Desirably, the handle extends from a position at or adjacent to an



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outer edge of the protective cover.

By repositioning the handle of these common devices, the inventor has created a device where more efficient use of the surface area of the protective cover can be made for shielding a user against adverse weather conditions. The novel arrangement not only provides a more convenient to use device for the user but can reduce the overall quantity and complexity of materials to be used in the manufacture of such a device rendering it cheaper and easier to manufacture than the known arrangements described above.

The framework of the novel device may comprise a main support strut and a plurality of additional support struts which are pivotable about a common axis, shared by the main support strut such that they can be fanned out from a storable configuration where they are substantially in alignment with one another to an erect configuration where each additional strut extends radially at a different rotational position on a circle having its centre at the common axis. A handle portion is optionally connected to one of the struts, desirably positioned at or adjacent an end of the strut which is opposed to the end at which the struts are pivotable. The handle is desirably itself hinged and/or hingedly connected to the strut. The handle can conveniently be connected to the main support strut.

Desirably, the main support strut is of substantially the same length as the additional support struts, this is not, however essential.

In an alternative embodiment, the frame and optionally also the handle may comprise a single moulded piece. In such an arrangement, the main supporting and each of the additional struts are connected by a series of flexible links known as "live hinges", which, when the frame is erected, encircle a centre point about which all the struts are pivotable. The circle formed by the live hinges when the frame is erect can be capped by a domed cap of diameter slightly greater than the circle formed by the live hinges. The domed cap may include a plug for snap fitting or fastening into a socket

provided within the circle formed by the live hinges. Typically the moulded frame and cap comprise the same material, desirably the material is a plastics material, for example a polyvinyl chloride (PVC) or a polyethylene (PE). The handle may also be foldable by means of a live hinge. Optionally the handle is hingedly connected to the frame by means of a live hinge. When the handle is extendable/foldable by means of a live hinge, the live hinge desirable has associated therewith a catch for securing the hinge in its closed position (which corresponds to an extended configuration of the handle).

The sheet of weather resistant material is secured to the main support strut and extends over each of the additional support struts such that when the struts are fanned out to the erect configuration, the material is stretched out to form a substantially smooth surface. The quantity of material is sufficient to close a circular area formed by the support struts when the framework is in its erect configuration. That is not to say that the shape of the protective cover need be circular, indeed it may be polygonal, square or any one of a number of geometric shapes into which a circle may be fitted.

The sheet of weather resistant material may include a flap at either or both of its ends which meet when the device is fanned out to its fully erect configuration. The flaps are preferably fixable onto the opposite end of the sheet so as to provide a leak proof join between the ends. The flaps may be fixable by any known means which may include but are not strictly limited to; press studs, hook and eye, Velcro™ or the like.

The sheet of weather resistant material may be selected according to the preferred application of the device. For example, if the device is for use against rain, sleet or snow then the material may be waterproof. Where the device is primarily for use as a sunshade, the material may be substantially opaque.

In a simple embodiment the struts may fan out in a horizontal plane, optionally, however, the struts may be arranged to fan at an angle to the

horizontal so as to provide a substantially dome or cone shaped surface over which the sheet of weather resistant material is stretched. This may provide for better dispersion of weather elements such as rain, sleet or snow. The cone or dome shape can be achieved by providing struts which are slightly curved at the end at which they are pivotally mounted, or by using flexible struts which, when erect, will bend under their own weight.

Desirably, the framework is provided with one or more locking mechanisms for locking the erected framework into position. Optionally, the one or more locking mechanisms may comprise a catch provided on the main support strut for catching an additional support strut when the support struts have been fanned out. The one or more locking mechanisms may further comprise a locking mechanism for locking the handle portion in its desired position for holding the device. The device may also include one or more locking mechanisms for locking the device in its storable configuration for ease of storage and transportation.

A locking mechanism for locking the handle in the upright configuration may comprise a collet portion which can be radially contracted for insertion through a collar and radially extended or biased to grip the collar from the inside.

Optionally, the handle portion may itself be collapsible, for example but not limited to, by being foldable or telescopically extendable and retractable.

For the purposes of clarification, some embodiments of the invention will now be described by way of example only and with reference to the following Figures in which:

Figure 1 illustrates the framework of a first embodiment of the invention in a fully erect configuration;

Figure 2 illustrates the framework of an embodiment similar to that of

Figure 1 in a partially erect configuration;

Figure 3 illustrates the framework of an embodiment similar to that of Figure 1 and Figure 2 in a collapsed configuration;

Figure 4 illustrates in general overview the framework of an alternative embodiment to that of Figures 1 to 3;

Figure 5 illustrates in more detail a locking mechanism for securing the framework of the embodiment of Figure 4 in its erect configuration;

Figures 6a and 6b illustrate in more detail a mechanism for securing the handle to the framework of the embodiment of Figure 4;

Figure 7 illustrates in more detail the connections between adjacent struts of the framework of the embodiment of Figure 4;

Figure 8 illustrates in more detail the centre of the framework of the embodiment of Figure 4 when in its erect configuration;

Figure 9 illustrates in more detail the handle of the embodiment of Figure 4.

As can be seen from Figure 1 an embodiment of the device according to the invention comprises essentially of a handle portion 10 attached by means of a hinge 12 to a main support strut 11 of the main cover support frame. A plurality of additional support struts S1, S2, ....S6 are pivotally mounted about a common pin 15 carried by the main support strut 11. A sheet of weather resistant material 16 is webbed between each of the struts in such a manner that when the frame is fully erect as shown in Figure 1, the weather resistant material is stretched taught to provide a robust, protective cover against inclement weather conditions. The handle 10 comprises a telescopically extendable pole having a gripping portion 10a at one end.

As can be seen from Figure 2, the main frame of the device is erected by simply fanning the additional support struts S1,...S6 about the pin 15. The outermost strut S6 can then be secured into position adjacent the main support strut 11 by a clip 14 provided on the main support strut 11. Also provided on the main support strut 11 is a second clip 13 which fixes the handle in an erected position substantially perpendicular to the main support strut 11.

As shown in Figure 3, the main support strut 11 has an essentially L shaped cross section with a pin 15 standing parallel to the long side of the L and extending perpendicularly from the shorter side of the L. It is to be understood that the L may be equally arranged to be upside down relative to its position as shown in the Figure without materially affecting the operation of the device. The pin is positioned adjacent one end of the main support strut. The additional support struts S1, S2, ....S6 are each pivotally mounted on the pin, the pivot point is in each case positioned adjacent one end of the strut and the struts are stacked one above the other. When the device is in its collapsed condition as shown in Figure 3, the additional support struts align and are received within the L shaped main support strut for compactness. The weather resistant cover 16 is folded and tucked behind the additional support struts, adjacent the long side of the L of the main support strut.

The telescopically extending handle is retracted to a length which is not much longer than the main support strut and folded into substantially parallel alignment with the main support strut by means of hinge 12. This results in a flat compact unit for transport and storage.

Figures 4 to 9 illustrate an alternative embodiment which is advantageous in that it's framework can be cheaply and easily manufactured from a small number of moulded components.

As can be seen from Figure 4, in common with the foregoing embodiments, this embodiment comprises a plurality of struts 41, S1, S2,.....,S8 sharing a common axis about which each is pivotable. However, in this arrangement the struts are all connected by flexible links or "live hinges" better shown in Figure 7. When the frame is erected, the links form a circle concentric about the common axis. A mushroom shaped plug 40 encloses the circle.

A main supporting strut 41 carries a collar 43 with an axis substantially parallel to the common axis. The collar 43 forms part of a connector for connecting a handle 42 to the frame 41, S1, S2,.....,S8. The connector is better illustrated in Figures 5 and 6b. the collar is shown in more detail in Figure 6a.

As can be seen from the Figure, when the frame is in its erected configuration, a terminal strut S8 meets with the main strut 41. As shown in more detail in Figure 5, the main 41 and terminal S8 struts are provided respectively with an upper 41a and a lower S8a surface shaped to engage with the opposed surface of the other strut. In addition, each of these struts has a protrusion 41b, S8b extending from the end of the strut furthest removed from the common axis. The protrusions are each provided with a ribbed surface 41c, S8c. The protrusions are configured to provide a convenient gripping means which may be used by a user erecting the frame to draw the main and terminal struts together with a one handed grip. Once drawn together, the two struts 41 and S8 can be secured together by fastening of a catch 44 which is hingedly connected (again by means of a live hinge) to the terminal strut and is configured to hook across an end surface of the main support strut and snap fit to the end of the main support strut whereby to fix the frame in its erect configuration.

As can be seen from Figures 6 and 6a, the handle 42 of the device comprises at one end a collet 62 which is receivable in the collar 43 and is resiliently biased, when inserted into the collar 43, to grip the collar 43 from



the inside. The collet 62 is desirably provided with a ridged or flanged end which, when the handle 42 is pulled so as to remove the collet 62 from the collar 43 without first radially contracting the collet 62, tends to resist removal of the handle 42. Adjacent the collet 62, it can be seen the handle 42 comprises a live hinge 61 which allows the handle 42 to be folded from the position shown in the Figure in the direction of the arrow. When the handle 42 is in its erect configuration as shown in the Figure, a catch 63 snaps the hinge 61 shut. The catch 63 is similar in configuration to the catch 44. The catch 63 is provided with a levered section 63a which the user may use to open the hinge 61 and fold the handle 42.

Figures 7 and 8 show in more detail the arrangement of live hinges which link together the struts 41, S1, S2.....S8. Moulded to the arrangement of live hinges is a socket 71 into which can be received a plug 81 of a domed or mushroom shaped cap 82 which, in use, serves to enclose the circular space formed by the hinges when the framework is in its erect configuration. The cap 82 may also serve to hold in place a sheet of weather resistant material which will, as previously described, be mounted on the frame.

Figure 9 shows the handle of the foregoing embodiment in more detail. It can be seen the handle 42 is moulded to provide a convenient and comfortable gripping surface 42a to be embraced by the hand of a user.

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